USSR

UDC: 621.317.335.3

BARTASHEVSKIY, Ye. L., BEREZA, A. Ye., PRIVALOV, Ye. N., ABKIN, Ye. B.

"Measurement of the Permittivity of Plates Which Partially Fill the Cross Section of a Rectangular Waveguide"

Translation: A procedure is considered for determining permittivity on the basis of plotting the field structure in the longitudinal and transverse cross section of a rectangular waveguide on the H_{10} mode with a plate on the narrow wall of propagation for the case where the permittivity of the plate is a complex quantity. The fundamental relationships are presented and some computational singularities are indicated. The results of some measurements of permittivity in the 3-cm band are given. Bibliography of two titles. E. L.

1/1

USSR

BARTASHEVSKIY, Ye. L., KANUNNIKOV, V. P., SKUBITSKIY, V. N.

"Use of Dielectric Resonators With Directional Coupling Elements to Measure Relative Permittivity"

Translation: In view of the difficulties which arise when dielectric resonators in the standing-wave or traveling-wave modes are used to measure complex permittivity, new modifications of standing-wave and traveling-wave dielectric resonators are proposed with directional couplers as their coupling elements. Both resonators are based on a circular dielectric waveguide with HE_{11} wave; the standing-wave dielectric resonator is tuned by moving a reflector, while the traveling-wave unit is tuned by displacement of the waveguide. It is noted that the traveling-wave dielectric resonator has a higher Q than the standing-wave unit, which makes it preferable for use. Two illustrations, bibliography of five titles. N. S.

1/1

USSR

UDC 681.2.084.2:541.132.3

BARTAZAROV, E. G., DEVDARIANI, I. V., KABANOV, P. S., and
MARTIROSOV, V. D.

"Input Device of pH-Meter With Unipolar Field Transistor"

Moscow, Izmeritel'naya Tekhnika, No 2, Feb 73, pp 65-66

Abstract: A study was made by the Special Design Office of Ana-
lytical Instrument Making in Tbilizi of the possibility to sub-
stitute electron tubes by field transistors with p-n transition
of KP102 (TN-1) type in the input stage of pH-metrical amplifier,
built according to the principle of transformation of the input
signal frequency. Good results were obtained with the use of a
schema with feedback servosystem in the input stage of pH-meter.
The principal schema and the equivalent schema of the input de-
vice are shown and calculation formulas for determining the main
parameters of the device are given. The described input device
used in the laboratory pH-meter, redoxmeter pH-673, works satis-
factorily. The device may be used in works with different types
of transducers of d-c voltage into a-c voltage. Two figures, three
bibliographic references.

1/1

Glass and Ceramics

BARTENEV, G. M., Doctor of Chemical Sciences, and MOTORINA, L. I., Candidate of Technical Sciences, Moscow State Pedagogical Institute imeni V. I. Lenin

"The Effect of Vibration on the Strength of Glass Fiber"

Abstract: Discrepancies in the results of measurements of the strength of glass fiber of the same chemical composition and even of the same fiber in different laboratories have been noted frequently. Although many factors affect the strength of glass fiber, the principal cause for the divergence of the results of strength measurements is considered to be the difference in the test methods. This article considers one such cause. It was found that small vibrations lower the strength of the tested glass fibers. The tests were conducted with vibrations of varying amplitudes in the frequency range from 15 to 3000 Hz. The strength of the fiber decreases with the increase of the amplitude of oscillations. This effect is practically independent of the frequency of vibration if the amplitude of the displacement is maintained constant. The maximum decrease in strength was observed in the tests at 110 Hz frequency, the resonance frequency for the test
1/2

USSR

BARTENEV, G. M., and MOTORINA, L. I., Steklo i Keramika, No 3, Mar 71, pp 34-36

instrument. The vibration itself has no effect on the strength of the fiber,
but rather on the test method. When the fibers are initially exposed to
vibrations for 6 hours and tested on a quiescent instrument the strength is
significantly higher than for the same fibers tested in the presence of
vibration. In the course of stressing glass fibers vibrations accelerate
the growth of defects and lead to the lowering of the strength of the fiber.

2/2

USSR

PAVLUSHKIN, N. M., and ZHURAVLEV, A. K.

"Legkoplavkiye Stekla" (Low-Melting Glasses), Moscow, Izd-vo "Energiya," 1970, 144 pp

Translation of Annotation: A summary is given of the results of studies on the production of low melting glasses, methods of investigating them, and areas of their application carried out in the USSR and elsewhere. Theoretical concepts regarding the structure of low melting glass are presented and methods and results of investigations on oxide, oxygen-free, and oxychalcogenide glasses are discussed. Data on the application of low-melting glasses as sealing coatings and as solders for various electronic devices are presented.

The book is intended for scientific and engineering personnel concerned with the study and development of low-melting glasses and their applications.

Table of Contents

1/3

1/2   036   UNCLASSIFIED   PROCESSING DATE--20NOV70
TITLE--LOW TEMPERATURE RELAXATION PHENOMENA IN RUBBER LIKE POLYMERS AT LOW
DEFORMATION --U--
AUTHOR-(02)-BARTENEV, G.M., KUCHERSKIY, A.M.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOPOL. SOEDIN., SER. A 1970, 12(4), 794-801

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CHEMICAL BONDING, LOW TEMPERATURE EFFECT, ACTIVATION ENERGY,
RELAXATION PROCESS, DEFORMATION RATE/(U)SKMS30 RUBBER, (U)SKN26 RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3006/1385   STEP NO--UR/0459/70/012/004/0794/0801

CIRC ACCESSION NO--AP0135059
                              UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0135059

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. STRESS STRAIN DIAGRAMS OF SKMS 30 AND SKN 20 RUBBERS REVEALED A RELAXATION PROCESS CHARACTERIZED BY A LOW ACTIVATION ENERGY AND A DEPENDENCE OF RELAXATION TIME ON STRESS. THE KINETIC STRESS WAS A FUNCTION OF TEMP. AND APPROACHED 0 AT 40-60DEGREES. THE EFFECT WAS ATTRIBUTED TO ORDERED SUPRAMOL. DOMAINS WHICH FORMED AUXILIARY NONCHEM. BONDS THAT BROKE AT A CRIT. STRESS.   FACILITY: MOSK. GOS. PEDAGOG. INST. IM. LENINA, MOSCOW, USSR.

UNCLASSIFIED

1/2   021   UNCLASSIFIED
TITLE--HYSTERESIS LOSSES OF CARBON BLACK REINFORCED VULCANIZATES, AT LOW   PROCESSING DATE--16OCT70
   STRAINS -U-

AUTHOR-(02)-BARTENEV, G.M., KUCHERSKIY, A.M.

COUNTRY OF INFO--USSR

SOURCE--KOLLOIDNYY ZHURNAL, 1970, VOL 32, NR 2, PP 171-176

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CARBON BLACK, VULCANIZATE, MECHANICAL STRESS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1993/0393   STEP NO--UR/0069/70/032/002/0171/0176

CIRC ACCESSION NO--AP0113311
                        UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0113311   PROCESSING DATE--16OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MECHANICAL LOSSES, RELATIVE RESIDUAL STRAIN AND STRESS OF CARBON BLACK REINFORCED BUTADIENE STYRENE VULCANIZATES PASS THROUGH A MAXIMUM WHEN PLOTTED VERSUS STRESS. THIS MAXIMUM IS ASSOCIATED WITH THE BREAKDOWN OF THE CARBON BLACK STRUCTURES AND AGGREGATES. THE KELVIN VOIGT MODEL CAN BE USED FOR A QUALITATIVE DESCRIPTION OF SOME STRAIN AND HYSTERESIS PROPERTIES OF CARBON BLACK REINFORCED VULCANIZATES AT CONSTANT STRAIN RATE.

UNCLASSIFIED

Acc. Nr:
AP0036521   𝔅   Ref. Code: UR 0069

EFFECT OF AN ACTIVE FILLER ON THE STRAIN PROPERTIES OF BUTADIENE-STYRENE RUBBER VULCANIZATES

Bartenev, G. M.; Kucherskiy, A. M.

Summary

The effect of a filler on the shape of the strain curves of rubber upon elongation up to 30 % has been studied. The strain curve consists of an initial curvelinear section followed by a rectilinear one. The shape of the rectilinear section is almost independent of the filler nature, being determined by its volume fraction. The location level of the recti- linear section is determined by the carbon black bonds and structures, rising sharply when continuous carbon black structures are formed.

D. n.

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REEL/FRAME
19721369

7

Acc. Nr: Abstracting Service: 4-70 Ref. Code:
   AP0041407   CHEMICAL ABST.   US0000
                                        B

79609y Thermodynamic description of relaxation phenome-
na in polymers. Bartenev, G. M.; Zelenev, Yu. V. (Dep. Phys.
Solids, Lenin State Teachers' Training Univ., Moscow, USSR).
J. Appl. Polym. Sci. 1970, 14(2), 393-408 (Eng). The anal. of
various deformations of an ordinary elastic body and a highly
elastic body accompanied by temp. changes shows that under ad-
iabatic conditions the dynamic characteristics of a polymer in a
highly elastic state depend on the amplitude of the applied stress
(in particular, their position on a frequency or temp. scale),
which is assocd. with the entropic nature of the highly elastic de-
formation. When describing the relaxation phenomena caused
by the response of the system of interacting kinetic units to the
external perturbation, the nonequil. thermodynamics relation be-
tween the "flow" and the "generalized force" is nonlinear even at
small deviations from the equil. state. Creep and stress relaxa-
tion are considered. The calcd. dependencies agree with expt.
                                                    RCTT
                                        ЕФ

                           REEL/FRAME
                           19751272

Acc. Nr. AP0045146   Abstracting Service: Ref. Code
                       CHEMICAL ABST.   UR0138

91302a Flow of rubber mixtures through dies of varying
length during extrusion. Guber, F. B.; Bartenev, G. M.; Roze-
noer, I. N.; Vershinina, O. Yu. (Nauch.-Issled. Inst. Rezin. Prom.,
Moscow, USSR). Kauch. Rezina 1970, 29(1), 26-9 (Russ). The
flow of SKS-30 ARKM-15 and SKN-26M (I) rubber mixts.
(contg. variable amts. of plasticizer and filler) through dies hav-
ing a length-to-diam. ratio of 0.5-5.0 was studied. The flow of
rubber mixts. through short dies at crit. pressures (which caused
the accumulation of highly elastic deformation) was accompanied
by elastic turbulence. The elastic turbulence was characterized
by slippage of rubber mixts. through the extruder. The surface
of the extrudate deteriorated and its diam. increased due to elas-
tic turbulence. Increased content of carbon black (II) brought
about improved surface quality and smaller extrudate diam., e.g.,
I filled with 40-60 parts II per 100 parts I exhibited markedly im-
proved properties. Thus, the properties of the extrudates were
mainly detd. by their elastic properties. The shrinkage of ex-
truded mixts. was inversely proportional to the length of the ex-
truder.   CKJR

REEL/FRAME
19780046

1/2   041   UNCLASSIFIED   PROCESSING DATE--02OCT70
TITLE--STRESS RELAXATION IN CROSSLINKED RUBBERLIKE POLYMERS -U-

AUTHOR-(02)-BARTENEV, G.M., LYALINA, N.M.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN., SER. A 1970, 12(2) 368-75

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--STRESS RELAXATION, POLYMER CROSSLINKING, BUTADIENE STYRENE
RESIN, NATURAL RUBBER, POLYBUTADIENE, SYNTHETIC RUBBER, VISCOUS FLOW,
LOW TEMPERATURE EFFECT, HIGH TEMPERATURE EFFECT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1992/0322   STEP NO--UR/0459/70/012/002/0368/0375

CIRC ACCESSION NO--AP0111516
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0111516
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECTS OF THE SUPRAMOL. STRUCTURE ON THE STRESS RELAXATION OF BUTADIENE STYRENE RUBBER (UROPRENE-1500) (I), NATURAL RUBBER (II), AND CIS,1,4,POLYBUTADIENE RUBBER (UROPRENE) (III) WERE INFERRED FROM PLOTS OF RELAXATION CURVES OBTAINED BY MEANS OF A POLYANI RELAXOMETER. THE EXPTL. DATA (TREATED BY A METHOD DEVELOPED BY A. V. TOBOLSKY, 1959 AND A. V. BRYUKHANOV, 1960) INDICATED THAT THE SLOW STAGE OF PHYS. RELAXATION CONSISTED OF 3 STEPS HAVING IDENTICAL ACTIVATION ENERGY (PROPORTIONAL TO THE MOL. INTERACTION OF POLYMER CHAINS). THE SLOW STAGE OF PHYS. RELAXATION AND THE VISCOUS FLOW OF I, II, AND III FOLLOWED THE SAME SEGMENTAL MODIFICATION OF THE SUPRAMOL. STRUCTURE. THE RELAXATION TIMES OF THE 3 ELEMENTARY STEPS OF SLOW RELAXATION WERE DIFFERENT, PRESUMABLE DUE TO DISSIMILAR DIMENSION OF THE ORDERED REGIONS IN THE POLYMERS. AT LOW TEMPS., THE RELAXATION TIME WAS MAINLY A FUNCTION OF THE ACTIVATION ENERGY, WHEREAS A HIGH TEMPS. IT WAS A FUNCTION OF THE PREEXPONENTIAL COEFF. (IN THE FORMULA FOR THE RELAXATION TIME). III HAD A SHORTER RELAXATION TIME THAN I AT LOW TEMPS. AND A LONGER RELAXATION TIME AT HIGH TEMPS.

1/2   042   UNCLASSIFIED   PROCESSING DATE--02OCT70
TITLE--MODELING OF THE DYNAMIC MECHANICAL PROPERTIES OF TWO COMPONENT
  HETEROGENEOUS POLYMER COMPOSITIONS BY THE TECHNIQUE OF COMPOSITE
AUTHOR-(03)-AYVAZOV, A.B., ZELENEV, YU.V., BARTENEV, G.M.

COUNTRY OF INFO--USSR

SOURCE--MEKH. POLIM. 1969, 5(6), 1119-22

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ELASTIC MODULUS, PLASTIC MECHANICAL PROPERTY, SYNTHETIC
  RUBBER, POLYSTYRENE RESIN, POLYMER BINDER, COMPOSITE MATERIAL,
  MATHEMATIC MODEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1989/0496   STEP NO--UR/0374/69/005/006/1119/0122

CIRC ACCESSION NO--AP0107101
                    UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0107101

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE COMPLEX DYNAMIC ELASTICITY MODULUS (E) AND TAN (MECH. LOSS ANGLE) (TAN DELTA) WERE DETD. IN THE MINUS 100 TO PLUS 100DEGREES RANGE FOR MIXTS. OF SYNTHETIC RUBBERS WITH POLYSTYRENE (I). ALSO E AND TAN DELTA WERE DETD. OF COMPOSITE SAMPLES CONSISTING OF PURE I BONDED TO PURE RUBBER. FORMULAS WERE REDUCED WHICH GIVE THE REAL (E SUB1) AND IMAGINARY (E SUB2, LESS MODULUS) COMPONENTS OF 3 IN TERMS OF E SUB1 AND E SUB2 OF THE MIXT. CONSTITUENTS. THERE IS A CLOSE CORRESPONDENCE BETWEEN THESE FORMULAS AND FORMULAS DEDUCED FOR THE MIXTS., WHICH SHOWS THAT THESE MIXTS. ARE HETEROGENEOUS AND THEREFORE THEIR MECH. DYNAMIC PROPERTIES ARE MATH. PREDICTABLE WHEN THEIR COMPN. IS KNOWN.

UNCLASSIFIED

TITLE--EFFECT OF IRON VALENCE STATE ON THE ANGULAR DISTRIBUTION OF
   ANNIHILATION GAMMA QUANTA IN IRON OXIDES -U-
AUTHOR-(03)-BARTENEV, G.M., TSYGANOV, A.D., VARISOV, A.Z.

COUNTRY OF INFO--USSR

SOURCE--FIZ. TVERD. TELA 1970, 12(2), 669-70

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS, CHEMISTRY

TOPIC TAGS--CHEMICAL BONDING, IRON, IRON OXIDE, X RAY ANALYSIS

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1984/0124   STEP NO--UR/0181/70/012/002/0669/0670
CIRC ACCESSION NO--AP0054920
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0054920   UNCLASSIFIED   PROCESSING DATE--18SEP70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF THE METAL CATION
VALANCE STATE IN OXIDES WAS STUDIED ON THE ANGULAR CORRELATION OF THE
ANNIHILATION PAIRS OF GAMMA QUANTA. THE ANGULAR DISTRIBUTION OF THE
ANNIHILATION RADIATION WAS DETD. IN THE FE OXIDES: FEO, FE SUB2 O SUB3,
AND FE SUB3 O SUB4. HALFWIDTHS OF THE CURVES AND THE EFFECTIVE CHARGES
OF THE O ION AS DETD. FROM THE HALFWIDTH, ARE TABULATED. AS THE OXIDN.
STATE OF FE INCREASES, THE SHIFT OF THE K EDGE INCREASES AND BROADENING
OF THE ANGULAR CORRELATION CURVE TAKES PLACE. THE EFFECTIVE CHARGE OF
THE O ION INCREASES IN THE SERIES FEO, FE SUB3 O SUB4, AND FE SUB2 O
SUB3. THE EFFECTIVE CHARGE OF THE FE ION IN THE ABOVE SERIES IS, RESP.,
1.0, 1.6, AND 1.95. THUS, VARIATION OF THE VALANCE STATE OF FE CAUSES A
SHIFT OF THE K EDGE OF THE X RAY ABSORPTION SPECTRUM AND BROADENING OF
THE ANGULAR DISTRIBUTION OF ANNIHILATION PAIRS OF GAMMA QUANTA
INDICATING A VARIATION OF THE DEGREE OF IONIC CHARACTER OF CHEM.
BONDING.

UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--27NOV70

CIRC ACCESSION NO--AP0134901
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE WETTING OF BUTADIENE
ACRYLONITRILE RUBBER SKN-18 IS DEPENDENT ON THE DEGREE OF STRETCHING.
THE SURFACE TENSION OF SKN-18 VARIES LINEARLY WITH THE DEGREE OF
STRETCHING AND VARIES WITH THE DIRECTION (IN RESPECT TO THE ELONGATION)
IN WHICH IT IS MEASURED.   FACILITY: FILIAL NAUCH.-ISSLED. INST.
REZIN. PROM., LENINGRAD, USSR.

UNCLASSIFIED

USSR   UDC 612.6:539.434

BARTENEV, G. M., Moscow Pedagogical Institute imeni V. I. Lenin

"Fracture of Flawless Inorganic Glasses"

Abstract: It is proposed that the kinetics of thermal-fluctuation failure of flawless glasses consists of two stages. In the first stage, which primarily determines the durability of a sample, the initial submicrocrack is generated from relatively weak sections of the glass structure. In the presence of a surface-active medium, fluctuation generation of the surface alleviates submicrocracks. In the second stage, the submicrocrack grows. Thus, overstressing the tip of the crack causes the critical stress value to be reached and the submicrocrack becomes a microcrack which is propagated rapidly, causing catastrophic failure of the sample.

     A comparison of theory with experimental curves on the durability of low-strength silicate glass made it possible to conclude that in the transfer of a sample from a vacuum to the atmosphere, both the energy of activation (135 down to 35 kcal/mol) and coefficient of stress concentration (25 down to 7) are decreased. In the current study of flawless quartz glass, the coefficient of concentration and fluctuation volume did not change; only the energy of activation
1/2

USSR

UDC 612.6:539.434

BARTENEV, G. M., Fiziko-Khimicheskaya Mekhanika Materialov, No 3, May-June 70, pp 71-77

varied.

The above discussion led to the premise that adsorption lowering of the strength in a solid can be observed not only in the presence of surface micro-cracks, as was previously believed, but also in solids which do not have surface defects. From this comes an explanation of increased strength in flawless glass and glass fibers in the transition to low temperatures (1-196°C): when the temperature is lowered the atmospheric humidity freezes and the strength of glass at low temperatures in an atmosphere coincides with the strength of glass in a vacuum.

2/2

1/2   035   UNCLASSIFIED   PROCESSING DATE--30OCT70
TITLE--MECHANISM OF STRESS RELAXATION IN RUBBER FILLED WITH CARBON BLACK
-U-
AUTHOR-(02)-BARTENEV, G.M., LYALINA, N.M.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN, SER. A 1970, 12(4), 922-31

DATE PUBLISHED------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--STRESS RELAXATION, CARBON BLACK, BUTADIENE STYRENE RESIN,
  MATERIAL DEFORMATION, ACTIVATION ENERGY, SYNTHETIC RUBBER/(U)SKS30A
  BUTADIENE STYRENE RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/1686   STEP NO--UR/0459/70/012/004/0922/0931

CIRC ACCESSION NO--AP0125307
                        UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--30OCT70
CIRC ACCESSION NO--AP0125307
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STRESS RELAXATION (SIGMA) OF
  CARBON BLACK FILLED SKS-30A (BUTADIENE-STYRENE RUBBER) AT 20-100DEGREES
  AND 2C-200PERCENT DEFORMATION (EPSILON) RANGES OBEYS A FIVE TERM
  EQUATION: SIGMA(T)EPSILON EQUALS E SUB1 EXP(T-TAU SUB1) PLUS E SUB2
  EXP(T-TAU SUB2) PLUS E SUB3 EXP(MINUS T-TAU SUB3) PLUS E SUB4 EXP(T-TAU
  SUB4) PLUS E SUB5 EXP(T-TAU SUB5), WHERE T IS THE RELAXATION TIME, E
  SUB1 A COEFF. INDICATING THE CONTRIBUTION OF THE I TH RELAXATION
  PROCESS, AND T SUB1 THE RELAXATION TIME OF THE I TH PROCESS. THE 1ST 3
  TERMS ARE RELATED TO THE RELAXATION OF NOT FILLED RUBBER, HAVE
  ASSOCIATED 13 KCAL-MOLE ACTIVATION ENERGY (PER TERM), AND ARE
  INDEPENDENT OF EPSILON. THE 4TH TERM IS DEPENDENT ON THE FILLER AMT.,
  EPSILON, AND HAS 18 KCAL-MOLE ACTIVATION ENERGY ASSOCD. WITH IT. THE
  5TH TERM IS ASSOCD. WITH 38-40 KCAL-MOLE ACTIVATION ENERGY; IT EXPRESSES
  THE CONTRIBUTION OF S CROSSLINKS TO THE RELAXATION PROCESS. ONLY THE
  4TH TERM IS DIFFERENT FOR THE FILLED AND UNFILLED SKS-30A; ITS PRESENCE
  IS NECESSITATED BY THE UNEVEN DISTRIBUTION OF STRESSES IN THE FILLED
  RUBBER.   FACILITY: MOSK. GOS. PEDAGOG. INST. IM. LENINA, MOSCOW,
  USSR.

UNCLASSIFIED

1/2   036   UNCLASSIFIED   PROCESSING DATE--16OCT70
TITLE--OBSERVATION OF MOLECULAR ORDERING IN RUBBERLIKE POLYMERS UNDER LOW
STRESS BY A CREEP TECHNIQUE -U-

AUTHOR-(02)-BARTENEV, G.M., GLUKHATKINA, L.G.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN. SER. B 1970, 12(3), 185-7

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--STRESS RELAXATION, POLYBUTADIENE, NITRILE RUBBER,
POLYISOBUTYLENE, POLYMER STRUCTURE, DEFORMATION RATE, CREEP/(U)SKB35
POLYBUTADIENE RUBBER, (U)SKN26M BUTADIENE NITRILE RUBBER, (U)PIB85
POLYISOBUTYLENE RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/1204

STEP NO--UR/0460/70/012/003/0185/0187

CIRC ACCESSION NO--AP0116669
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0116669
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STRESS RELAXATION GRAPHS WERE
OBTAINED FOR SKB-35 (POLYBUTADIENE), SKN-26M (BUTADIENE NITRILE RUBBER),
AND PIB-85 (POLYISOBUTYLENE) IN 0-100DEGREES RANGE. EACH RUBBER AT A
GIVEN TEMP. ACHIEVED AN EQUIL STRUCTURE, I. E., A STRUCTURE SUSCEPTIBLE
TO AN IRREVERSIBLE ALTERATION BY APPLYING A SMALL LOAD. THE DEFORMATION
RATE WHICH WAS JUST SUFFICIENT TO ALTER IRREVERSIBLY THE RUBBER
STRUCTURE WAS CALLED MICROVISCOSITY. MICROVISCOSITY DEPENDED ON THE
SAMPLE STORAGE TEMP.   FACILITY: MOSK. GOS. PEDAGOG. INST IM.
LENINA, MOSCOW, USSR.

UNCLASSIFIED

1/2   025   UNCLASSIFIED   PROCESSING DATE--16OCT70
TITLE--POSITRON ANNIHILATION IN QUARTZ IRRADIATED BY FAST NEUTRONS -U-

AUTHOR-(04)-BARTENEV, G.M., TSYGANOV, A.D., VARISOV, A.Z., PROKOPYEV,
  YE.P.

COUNTRY OF INFO--USSR

SOURCE--FIZIKI, 1970, VOL 58, NR 6, PP 1904-1910

DATE PUBLISHED-------70

SUBJECT-AREAS--PHYSICS

TOPIC TAGS--POSITRON, PARTICLE ANNIHILATION, QUARTZ, NEUTRON IRRADIATION,
  PHOTON EMISSION, ANGULAR DISTRIBUTION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1998/0029   STEP NO--UR/0056/70/058/006/1904/1910

CIRC ACCESSION NO--AP0120729
                              UNCLASSIFIED

CIRC ACCESSION NO--AP0120729
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT OF FAST NEUTRON
IRRADIATION ON THE ANGULAR DISTRIBUTION OF ANNIHILATION V QUANTUM PAIRS
IN CRYSTAL AND FUSED QUARTZ IS INVESTIGATED. IT IS FOUND THAT THE
HALFWIDTH OF THE CORRELATION CURVES CORRESPONDS TO THE VARIATION OF THE
QUARTZ DENSITY. FROM AN ANALYSIS OF VARIOUS POSITRON STATES IN QUARTZ
PRECEDING ANNIHILATION AND ON BASIS OF THE EXPERIMENTAL DATA IT IS
CONCLUDED THAT VARIATION OF THE HALF WIDTH IS DUE TO THE APPEARANCE IN
THE CORRELATION CURVES OF A NARROW COMPONENT WHOSE INTENSITY DEPENDS ON
THE RADIATION DOSE. THE NARROW COMPONENT IS DUE TO ANNIHILATION DECAY
OF PARA POSITRONIUM ATOMS PRODUCED IN IRRADIATED QUARTZ.
FACILITY: GOSUDARSTVENNYY PEDAGOGICHESKIY INSTITUT IM. V.I. LENINA.

UNCLASSIFIED

USSR   UDC 621.7.029

OBUKHOV, A. P., SOKOLOVA, T. V., and BARTENEV, S. S., Physico Technical
Institute imeni A. F. Ioffe, USSR Academy of Sciences

"Study of Pore Size Distribution in Sprayed Coatings"

Abstract: Pore size distribution in solids can be determined by several
methods. Mercury porosimeter and metallographic analysis methods were com-
pared as a means of determining pore size distribution in aluminum oxide coat-
ings. The coatings were prepared by gas flame spraying or plasma spraying.
Determinations of pore size by hydrostatic suspension and the mercury porosi-
meter agreed well with each other but did not agree with the results obtained
by microphotographic methods. Gas flame-sprayed coatings showed a porosity
of $12.5 \pm 0.5\%$ by either hydrostatic suspension or porosimeter methods and
$11.6 \pm 0.5\%$ by the microphotographic methods. Plasma spraying gave $9.3 \pm$
0.3% and $7.9 \pm 0.5\%$, respectively. It was concluded that the porosimeter
method measured the distribution of pore size by the "narrowing" of sizes and
that analysis by microphotographic methods measured "edges." Therefore,
because of the heterogeneous particle forms in the coating operation, the
latter method is recommended.
1/1

- 6 -

BARTENEV, V. D.

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Title: Forming in a Vacuum a Jet Target From Condensed Hydrogen
BNL-TR-465

Author: V.D.Bartenev, A.I.Valevich, Yu.K.Pilipenko. V.V.Smolyanskiy

Prepared by: AEC

Country: USSR

Date of Document: 1972

Classification: UNCLASSIFIED

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FOR OFFICIAL USE ONLY

USSR   UDC 669.71:620.178.3

OK'KIN, B. I., BARTEN'EVA, G. F., and SAVOST'YANOVA, T. G.

"Investigation of the Durability of Aluminum Alloys"

Abstract: Consideration is given to a procedure for testing the durability
of flat specimens during the action of cyclical temperature stresses, and
experimental data are presented on the durability of alloy AK4-1T specimens
under the action of cyclical temperature and mechanical stresses with a
supplementary static load. 4 figures. 1 table. 2 references in the form
of foot notes.

1/1

USSR

UDC 620.193.47

MIKHAYLOVA, N. A., ZHUK, N. P., BARTEN'YEVA, I. A., and TURKOVSKAYA, A. V.,
Moscow Institute of Steel and Alloys

"Corrosion Mechanism of Aluminum in Acetic and Formic Acids and Their Mixtures"

Abstract: The corrosion mechanism of aluminum in acetic and formic acids and their mixtures was investigated. Grade A97 aluminum was studied in 43% HCOOH, 50% CH_3COOH and in a ternary mixture: 33% CH_3COOH + 27% HCOOH + 40% H_2O at several temperatures. Electrochemical and corrosion characterisitcs were examined on aluminum specimens 20 x 20 x 2 mm in size. When the potential of aluminum is shifted from its stationary value toward the positive side, passivation of Al commences quite rapidly, a small passivity region is observed, and, finally, a region of disturbance in the passivated state. Comparison of the flows of aluminum dissolution in the region of potential-independence and for the steady-state potential permits an approximate estimate of the contribution of electrochemical and chemical mechanisms to the total rate of spontaneous corrosion of aluminum. A comparison of the three dissolution situations showed that acetic acid is the mixture component increasing the proportion of metal dissolved by the chemical mechanism. This can be explained in the lower

1/2

USSR

MIKHAYLOVA, N. A., et al., Zashchita Metallov, Vol 7, No 5, 1971, pp 575-578

(by one order of magnitude) dissociation constant of acetic acid compared with that of formic acid. When acetic acid is diluted with water, the role of the electrochemical mechanism becomes greater. This can be related to the increased degree of acid dissociation with increased dilution of the acid. The chemical corrosion of aluminum in acetic and formic acids is suggested to be due to the interaction of metal with ambient oxygen and is not accompanied by the evolution of hydrogen:

$$4Al + 3O_3 + 12H^+ = 4Al^{3+} + 6H_2O.$$
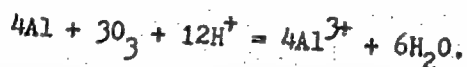
Accordingly, when the amount of solute oxygen is reduced, the corrosion rate of aluminum decreases and in 50% CH_3COOH saturated with oxygen, air, and nitrogen is 0.300, 0.097, and 0.022 g/m^2.hour, respectively at 22°.

2/2

Nitrogen Compounds

USSR   UDC 547.571+547.551+666.718

STEPANOVA, G. P., BARTININKAS, R. L., STEPANOV, B. I. Moscow Chemical-
Technological Institute imeni D. I. Mendeleyev

"A Condensation of Aromatic Aldehydes with Aromatic Amides of Acetoacetic Acid
in the Presence of Hexachlorocyclophosphazatriene"

Abstract: The reaction of benzaldehyde and o-nitrobenzaldehyde with the
anilide, o-chloroanilide, and o-aniside of acetoacetic acid in the presence
and in the absence of hexachlorocyclophosphazatriene ($\underline{I}$) was studied. An
excess of the aldehyde in chloroform was used. The reaction products were
washed with water and purified by recrystallization. $\underline{I}$ acts as promoter of
the condensation reaction of aldehydes with compounds containing active
methylene groups. The proposed mechanism includes adduct formation with a
positive charge arising at the carbonyl C atom of the carbonyl group so that
the electrophilic activity of the aldehyde is enhanced. The adduct reacts
then with acetoacetic acid amide, the phosphorus moiety is eliminated and the
arylideneactetylacetamides are obtained. IR and UV spectra were obtained for
identification of the products.

1/1

USSR   UDC: 621.397.62

ZDANYS, J., MASIULIS, F., BARTKEVIČIUS, S.

"Stabilized Power Supply for the YHT-59 Television Set"

V sb. Elektrotekhnika (Electrical Engineering—collection of works), Kaunas,
1970, pp 181-182 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12G179)

Translation: The article is devoted to calculating the basic parameters
of a ferroresonance voltage stabilizer under the condition that the load
power is constant. Theoretical and experimental data are given for a
stabilizer built in accordance with the given recommendations. Resumé.

1/1

USSR

UDC: 512.25/.26+519.3:330.115

BARTKUS, A.

"Setting up Calendar Production Schedules by the Methods of Linear Programming"

V sb. Avtomatika i vychisl. tekhn. (Automation and Computer Technology--collection of works), No 3, Vil'nyus, "Mintis", 1971, pp235-242 (from RZh-Kibernetika, No 12, Dec 71, Abstract No 12V823)

Translation: The problem of compiling a calendar schedule of work area loads reduces to a combinatorial problem in linear programming. Minimization of the overall production cycle is taken as the target function. A heuristic method of solving the problem is given together with an illustrative example. Author's abstract.

1/1

- 40 -

TITLE--1,3,DICL CCNVERSION MECHANISM IN THE PRESENCE OF ACID CATALYSTS. 1.
   CONVERSION OF 1,3,PROPANEDIOL, 1,3,BUTANEDIOL AND BETA OXIDES ON CALCIUM
AUTHOR-(04)-FREYDLIN, L.KH., SHARF, V.Z., BARTOK, M., NAZARYAN, A.A.

COUNTRY OF INFO--USSR

SOURCE--IZV. AKAD. NAUK SSSR, SER. KHIM. 1970, (2), 310-14

DATE PUBLISHED----------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--PROPANE, BUTANE, HYDROXYL RADICAL, ORGANIC OXIDE, ACID
   CATALYSIS, FURAN, EPOXIDE, KETONE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0749   STEP NO--UR/0062/70/000/002/0310/0314

CIRC ACCESSION NO--AP0124419
                    UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0124419   PROCESSING DATE---30OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PRODUCTS FORMED BY PASSAGE AT 275-350DEGREES OVER CA SUB3 (PO SUB4) SUB2 OF HO(CH SUB2) SUB3 OH, TETRAHYDROFURAN, AND ALLYL ALC. WERE TABULATED FOR EACH TEMP. IN 25DEGREES STEPS. SIMILAR DATA ARE REPORTED FOR HO(CH SUB2) SUB2 CHMEOH AND 2,METHYLTETTRAHYDROFURAN, BOTH RUN OVER 230-300DEGREES. THE 1,3,DIOLS ARE CONVERTED INTO A MIXT. OF SATD. AND UNSATD. ALCS., ALDEHYDES, KETONES, EPOXIDES, AND OTHER COMPDS. DEHYDRATION OCCURS BY 2 PATHS TO AN UNSATD. ALC. AND TO A CYCLIC OXIDE, WITH INTRAMOL. CYCLIZATION BEING PREDOMINANT. OXIDES ARE THEN CONVERTED BY ISOMERIZATION TO UNSATD. ALCS. AND CARBONYL COMPDS. MUCH OF THE SATD. ALCS. AND UNSATD. ALDEHYDES IS FORMED BY THE H TRANSFER REACTIONS. 2,2,DIETHYL,1,3,PROPANEDIOL GAVE 11PERCENT 3,3,DIETHYLTRIMETHYLENE OXIDE, 18PERCENT ISOMERIC HEPTENOLS, AND 71PERCENT MIXED PRODUCTS AT 300DEGREES; 2,BUTYL,1,3,PROPANEDIOL GAVE NO TRIMETHYLENE OXIDE DERIVS. BUT 20PERCENT ISOMERIC HEPTENOLS AND 80PERCENT MIXED PRODUCTS. 2,BUTYLTRIMETHYLENE OXIDE WAS 98PERCENT CONVERTED TO ALCS. AND OTHER PRODUCTS AT 300DEGREES.   FACILITY: INST. ORG. KHIM. IM. ZELINSKOGO, MOSCOW, USSR.

UNCLASSIFIED

USSR   UDC: [625.282:621.438]:003.1

BARTOSH, Ye. T. and MEYLIKHOV, M. Ye.

"Problems of Gas Turbine Traction"

Moscow, Izvestiya Akademii Nauk SSSR--Energetika i Transport, No.
4, 1971, pp 82-92

Abstract: Gas turbine engines, as the answer to the problem of
more efficient railroad transportation for a growing national
economy, are discussed. Because locomotives of this type burn
relatively cheap sulphur fuels, require less lubrication, and are
simpler in construction, their use throughout the world and es-
pecially in the Soviet Union is desirable. They have the addi-
tional advantage of providing higher power levels for smaller di-
mensions and weight. Through three experimental gas turbine loco-
motives, the freight G1-01 and two passenger GP1 built at the
Kolomenskiy Locomotive Plant imeni V. V. Kuybyshev, Soviet engi-
neers have gained a good deal of experience with this type of de-

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USSR

BARTOSH, YE. T., and MEYLIKHOV, M. YE. , Izvestiya Akademii Nauk SSSR -
Energetika i Transport, No 4, 1971, pp 82-92

sign. The article discusses some design problems and their pos-
sible solutions. A table comparing the characteristics of this
type of engine with those of diesels is presented. Among the im-
portant problems connected with the gas turbine engine are improve-
ment in its economy, the design of simple transmissions, and adap-
tation to the use of heavy liquid fuels of various types.

2/2

Acc. Nr:
AP0040958

Abstracting Service:
CHEMICAL ABST. 4/70

Ref. Code:
UR0068

B

80828a Drying and handling ammonium sulfate in a vibrating fluidized bed. Petrenko, D. S.; Bartoshevich, V. I. (Kiev. Filial GNIIKhP, Kiev, USSR). Koks Khim. 1970, (1), 44-6 (Russ). The effectiveness of using the vibrating fluidized-bed technique in drying (from 3-4% to 0.1% humidity) of $(NH_4)_2SO_4$ (I) was investigated by means of an exptl. app. having a productivity of 60 kg/hr I. The app. is described in detail. The construction of the app. permits variation of various mech. and technological parameters, e.g., duration of the process, intensity of vibrating fluidization, etc. The optimal dynamic parameters were detd. This technique greatly improves the coeff. of heat transfer and accelerates the process 1.6 times. The drying process described can be easily modeled and automated.

I. Haiduc

ALS

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REEL/FRAME
1975020

TITLE--STRUCTURE AND INTERFACIAL SURFACE OF DISPERSED GAS,LIQUID AND
GAS,LIQUID,SOLID SYSTEMS FORMED IN FOAM APPARATUS -U-

AUTHOR-(04)-YENGIBARYAN, S.N., TARAT, E.YA., MUKHLENOV, I.P., BARTOV, A.T.

COUNTRY OF INFO--USSR

SOURCE--ZH. PRIKL. KHIM. (LENINGRAD) 1970, 43(5), 1178-82

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, MATERIALS

TOPIC TAGS--CHEMICAL ENGINEERING, COPPER SULFATE, AQUEOUS SOLUTION, PHASE
ANALYSIS, MODEL, SODIUM HYDROXIDE, FOAM

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3004/0955   STEP NO--UR/0080/70/043/005/1178/1182

CIRC ACCESSION NO--AP0131540
                              UNCLASSIFIED

CIRC ACCESSION NO--AP0131540

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. HYDRODYNAMIC STUDIES OF DISPERSED
GAS LIQ. (AIR WATER, AIR SATD. $CuSO_4$ SOLN., 3PERCENT CO_2 IN AIR
1.8N NAOH) AND GAS LIQ. SOLID (AIR SATD. $CuSO_4$ SOLN. $CuSO_4$
CRYSTALS) SYSTEMS WERE CONDUCTED IN A PLANAR (2-DIMENSIONAL) FOAMING
APP. MODEL AT GAS VELOCITIES SMALLER THAN OR EQUAL TO 2.5 M-SEC.
CHANGES IN THE SURFACES OF THE CONTACTING PHASES AND CHANGES IN
STRUCTURE WERE FOLLOWED CINEMATOGRAPHICALLY. THREE DISTINCT
HYDRODYNAMIC REGIMES WERE IDENTIFIED WHICH VARIED WITH THE GAS VELOCITY
W; AT LOW W, THE GAS WAS DISPERSED IN THE LIQ.; AT INTERMEDIATE W, AN
INVERSION OF PHASES OCCURRED AND CLUSTERS OF LIQ. DROPLETS AND GAS
BUBBLES (VOIDS) WERE PRESENT; AND AT HIGH W, THE LIQ. WAS FULLY
DISPERSED IN THE GAS. CHANGES IN THE GAS VOL. FRACTION, SP. CONTACTING
SURFACE OF THE CLUSTER, AND PRESSURE DROP CHANGES IN THE LAYERS DETD. AS
A FUNCTION OF TIME ARE DISCUSSED; TWO MODES OF GAS FILLING OF THE LIQ.
CLUSTERS AND OF THE VOIDS WERE OBSD. AND ARE DISCUSSED.
FACILITY: LENINGRAD. TEKHNOL. INST. IM. LENSOVETA, LENINGRAD, USSR.

UNCLASSIFIED

USSR   UDC 576.858.095.38.095.18:[615.373.6:457.962

KUL'BERG, A. Ya., PRIYMYAGI, L. S., BAPTOVA, L. M., SHMELEVA, N. Ye., and
FADEYEVA, L. L., Institute of Epidemiology and Microbiology imeni N. F.
Gamaleya, Academy of Medical Sciences USSR, Tallin Institute of Epidemiology,
Microbiology, and Hygiene, Ministry of Health, Estonian SSR, and Institute
of Virology imeni D. I. Ivanovskiy, Academy of Medical Sciences USSR

"Study of the Interferon-Inducing Activity of Gamma Globulin and Its Fab[+]
Fragment"

Abstract: Human gamma globulin in aggregated form is capable of inducing inter-
feron in mice. Its interferonogenic activity is higher than that of the frac-
tion free of aggregates or that of the original gamma globulin. The difference
is even more pronounced when it is heated to 63°C. The aggregate-free fraction
has virtually no interferonogenic activity, whereas that of the aggregated
fraction fraction is 3 to 4 orders higher than that of crude gamma globulin.
To evaluate the species specificity of the proteins, the interferonogenic
activity of highly purified preparations of lapine and bovine gamma globulins
was investigated in experiments on rabbits. Both induced interferon but
heterologous gamma globulin was more active than homologous globulin. The Fab[+]
fragment of gamma globulin, which constitutes only one-third of the molecule,
1/2

USSR

KUL'BERG, A. YA., Byulleten' Eksperimental'noy Biologii i Meditsiny, No 11, 1972, pp 63-66

induced as much interferon as the unsplit molecule. The authors conclude that the interferon-inducing activity is caused by the gamma globulin proper and not by any admixtures that it may contain such as viruses or polysaccharides.

2/2

- 21 -

USSR

AKHIYEZER, I. A.; BARTS, B. I.; LAZURIK-EL'TSUFIN, V. T. (Khar'kov State University)

"Oscillations of a Drop of Fermi Liquid and Giant Resonance in Medium and Heavy Nuclei"

Moscow, Yadernaya Fizika; May, 1972; pp 863-8

ABSTRACT: Giant resonance in nuclear reactions with medium and heavy nuclei was considered in the model of a drop of Fermi liquid. Both purely nuclear and electrical interactions between nucleons were taken into account. Within this model it is possible to describe the experimentally observed position of giant dipole resonance in photonuclear reactions with a large number of nuclei: in particular, to explain a slower decrease of the resonant energy with increasing A than according to the usual law for liquids $A^{-\frac{1}{3}}$. The parameters involved were taken from an analysis of data not related to giant resonance. A number of experimental points do not fall on the curve corresponding to the excitation of dipole oscillations but fall near the calculated curves corresponding to $\ell = 0$ and $\ell = 2$. Consequently, the experimental determination of the multipolarity of the corresponding levels should be of great interest.

1/1

USSR

UDC: none

AKHIYEZER, I. A. and BARTS, B. I.

"Theory of (γ,N) Reactions at Energies Above the Pion Generation Threshold"

Moscow, Yadernaya Fizika, vol. 15, No. 2, 1972, pp 251-257

Abstract: With the recent construction of electron accelerators at energies amounting to several Gev, a number of experimental research projects in photonuclear reactions, with the release of nucleons in the higher energy regions, have been performed. This paper represents a theoretical study of such reactions in the energy area of photons exceeding the levels at which the Levinger theory is justified. This theory explains the experimental data from the angular and energy dependence of released protons and from the dependence of cross sections on the mass number. Modifying the Levinger theory, the authors begin their analysis by citing the cross section of the reaction as $\gamma + A \rightarrow A' + N + \pi$, representing the photonuclear reaction, accompanied by the release of nucleons, likely to occur at energy levels of several hundreds of Mev. It is this reaction, as opposed to the Levinger equation of $\gamma + A \rightarrow A' + p + n$, which is basically the subject of investigation in the present paper.
1/1

USSR

AKHIEZER, I. A., BARTS, B. I.; LAZURIK-EL'TSUFIN, V. T. (Kharkov State University imeni A. M. Gorkiy)

"Giant Resonance in a Model of a Fermi-Liquid Drop"

Abstract: Giant resonance in nuclear reactions is related to the collective (or bulk) vibrations of the surface and nuclear particles. An attempt is made to understand giant resonance in real nuclei by considering the finite dimensions of the nucleus in a Fermi-liquid drop and by comparing theoretical and experimental data on dipole resonance in photonuclear reactions. The drop is viewed as a sphere, and both nuclear and electrical forces acting between the nucleons are considered.

The model of a Fermi-liquid drop with a free boundary is shown to be a good description of giant dipole resonance for a large number of nuclei.

1/2

USSR

2/2

USSR

AKHIYEZER, I. A.; BARTS, B. I. (Physics-Engineering Institute of the Ukrainian
Academy of Sciences, Khar'kov)

"Oscillations of a Fermi Fluid in a Gravitational Field"

ABSTRACT: The properties of a system of Fermi particles (Fermi fluid) are
studied in a gravitational field. Apparently the substance of neutron stars
may be considered as such a system. The equilibrium distribution of a Fermi
fluid in a gravitational field (the barometric formula for a Fermi fluid) is
found. The hydrodynamic equations describing low-frequency motions of such a
system are derived.

Collective oscillations of a Fermi fluid in a gravitational field are in-
vestigated. It is shown that two zero sound modes and two ordinary sound modes
may propagate in it so that under certain conditions sound waves can appear.
If such an occurence takes place in a neutron star, it must lead to turbulent
phenomena in the external strata of the star.
1/1

USSR

AKHIYEZER, I. A.; BARTS, B. I. (Khar'kov State University)

"Theory of Fluctuations and Scattering of Slow Pions in Nuclear Matter"

Moscow, Journal of Nuclear Physics; January, 1970; pp 168-77

Δ Δ Δ

ABSTRACT: The fluctuations of "nuclear matter" in the Fermi-liquid model, taking into account the strictly nuclear as well as the electrical interaction among nucleons, are studied. It is shown that the electrical forces essentially modify the nature of long-wave fluctuations in the densities of the nuclear matter and charge. In particular, in the expressions for correlators of fluctuations of given magnitudes sharp maximums occur, caused possibly by the propagation of coupled oscillations of density and the density of the charge in the nuclear matter. The effect of electrical forces on the scattering of slow pions by nuclei is studied. In addition, the electrical interactions of incident pions with protons of the nucleus as well as the electrical interactions among the nucleons of the nuclear matter itself are studied. It is shown that the electrical forces must also be considered along with the nuclear forces if the momentum transfer does not exceed 30 Mev/c.
1/2

USSR

AKHIYEZER, I. A., et al., Journal of Nuclear Physics; January, 1970; pp 168-77

The authors express their gratitude to A. I. Akhiyezer for his valuable discussion of the work.

The article includes 36 equations. There are 8 bibliographic references.

2/2

1/2   022
UNCLASSIFIED
TITLE--THEORY OF FLUCTUATIONS AND SCATTERING OF SLOW PIONS IN NUCLEAR
    MATTER -U-
PROCESSING DATE--16OCT70
AUTHOR-(02)-AKHYEZER, I.A., BARTS, B.I.

COUNTRY OF INFO--USSR

SOURCE--YAD. FIZ. 1970, 11(1), 168-77

DATE PUBLISHED--------70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--PION SCATTERING, HEAVY NUCLEUS, NUCLEAR MODEL, EXCITED
    NUCLEUS, COULOMB INTERACTION, OSCILLATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1980/0186
STEP NO--UR/0367/70/011/001/0168/0177

CIRC ACCESSION NO--AP0048478
UNCLASSIFIED

2/2   022   UNCLASSIFIED   PROCESSING DATE--16OCT70
CIRC ACCESSION NO--AP0048478

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. SURFACE EFFECTS CAN BE NEGLECTED
IN THE STUDY OF COLLECTIVE VOL. EXCITATIONS OF SUFFICIENTLY HEAVY
NUCLEI; SUCH EXCITATIONS CAN BE REGARDED AS OSCILLATIONS OF NUCLEAR
MATTER. IN SUCH A MODEL, THE INTERACTION OF SLOW PIONS, E, AND OTHER
PARTICLES WITH NUCLEI CAN BE CONSIDERED AS A SCATTERING OF THESE
PARTICLES ON THE FLUCTUATIONS OF NUCLEAR MATTER. THESE FLUCTUATIONS ARE
STUDIED IN THE FERMI LIQ. MODEL WHEREIN BOTH THE NUCLEAR AND
ELECTROMAGNETIC INTERACTIONS BETWEEN THE N ARE TAKEN INTO ACCOUNT.
ELEC. FORCES MODIFY, IN AN ESSENTIAL WAY, THE CHARACTERISTICS OF
LONGWAVE FLUCTUATIONS OF THE NUCLEAR MATTER D. AND CHARGE D.   THE
ELECTROMAGNETIC INTERACTION LEADS TO 2 EFFECTS: TO A SPLITTING OF THE
MASSES OF QUASI PARTICLES, AND TO AN ADDNL. POTENTIAL INTERACTION ENERGY
BETWEEN CHARGED QUASI PARTICLES. IN THE EXPRESSIONS GIVING THE
CORRELATION FUNCTIONS OF THE FLUCTUATIONS, THERE ARISE SHARP MAX. FROM A
PROPAGATION IN NUCLEAR MATTER OF COUPLED OSCILLATIONS OF THE D. OF
MATTER AND OF CHARGE. INFLUENCE OF THE ELEC. FORCES ON THE SCATTERING
OF SLOW PIONS BY NUCLEI IS CONSIDERED. BOTH THE ELEC. INTERACTIONS OF
INCIDENT PIONS WITH NUCLEAR P, AND THE INTERACTIONS BETWEEN THE N IN
NUCLEAR MATTER ARE TAKEN INTO ACCOUNT. IT IS NECESSARY TO CONSIDER THE
ELEC. FORCES FOR MOMENTUM TRANSFERS WHICH DO NOT EXCEED 30 MEV-C.
FACILITY: KHAR'KOV. GOS. UNIV., KHARKOV, USSR.

UNCLASSIFIED

USSR

AKHIYEZER, I. A., BARTS, B. I., BOLOTIN, YU. L.

"Proton-Neutron Correlation in Medium and Heavy Nuclei"

Moscow, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 11, No 11, 5 June 1970, pp 557-559

Abstract: In the light of possible equality of the chemical potential of neutrons and protons, it is of interest to consider the question of the consequences of proton-neutron (pn) pairing. In this paper it is demonstrated that this pairing essentially changes (by comparison with ordinary pp and nn pairing) the isotopic structure of the correlation functions of the nucleons of the nucleus. The author begins his analysis with the Hamiltonian

$$ H' = -\Sigma I a^{i_1 +}_{p_1 s_1} a^{-i_1 +}_{-p_1 s_1} a^{-i_2}_{-p_2 s_2} a^{i_2}_{p_2 s_2} : $$

where a^i_{ps}, a^{i+}_{ps} are the operators of destruction and generation of a nucleon with the pulse p, the spin projection s, and the isospin projection i; and I is the interaction potential, which is nonzero in a narrow energy range near the Fermi range. He

1/2

- 115 -

USSR

AKHIYEZER, I. A., et al, Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 11, No 11, 5 June 1970, pp 557-559

then uses the ordinary method of superconductivity theory to obtain expressions for the Fourier components of the correlation functions of the nucleon density ($\Phi^{(0)}$) and isospin density ($\Phi^{(i)}$). It is pointed out that the isotopic structure of the correlation functions obtained differs appreciably from the isotopic structure of the correlation functions in the ordinary (two-fluid) superconducting model of the nucleus in which the correlation of the superconducting type occurs only between particles of one variety. This difference between the quasi-fluid and quasideuteron models of the nucleus can be essentially exhibited in a number of processes of interaction of particles with nuclei. Graphs are presented which clearly show that in the case of pairing of the quasideuteron type the scattering cross section has an essentially different nature than in the case of pairing of the two-fluid type.

2/2

USSR   UDC 612.821.2.014.46:615.357.452

BARU, A. M., and BOZHKO, E. Kh., Laboratory of Biochemistry, Khar'kov Scientific
Research Institute of Neurology and Psychiatry

"Effect of Some Inhibitors and Metabolites of Catecholamine Metabolism on the
Processes of Fixation and Reproduction of Memory Traces

Abstract: The formation and reproduction of a conditioned-defense avoidance
reaction was studied in white Wistar rats after administration of substances
affecting catecholamine metabolism. It was found that teturam (disulfiram) in-
hibits the synthesis of norepinephrine and sharply depresses the reproduction of
a steadily evolved avoidance response; this effect may be prevented by prelimin-
ary introduction of monoaminooxidase inhibitor (iprazid). It was found that some
animals exhibited an inability to learn and that iprazid was conducive to rein-
forcement of the conditioned defense avoidance reaction. Chronic introduction
of 3,4-dimethoxyphenylethylamine impeded the formation of the response, while
single injections resulted in inhibition of preliminary evolved reactions. The
possible role of catecholamines in the processes of formation and reproduction
of "memory traces" is discussed.
1/1

USSR

UDC 669.296:620.193.41

FOKIN, M. N., BARU, R. L., and KURTEPOV, M. M.

"Corrosion of Zirconium in Hydrochloric Acid"

Translation: Zirconium is stable in 20 and 30% solutions of HCl unless the concentration of oxidizing agents exceeds 0.01-0.5 g/l. With an increase in the concentration of oxidizing agents, pitting is observed, as well as an increase in total corrosion. The tendency toward pitting is estimated according to pitting potentials measured by the galvanostatic method. Zirconium does not undergo hydrogen embrittlement in HCl and can therefore be used to make insoluble cathodes operate in reducing media. Two illustrations. Bibliography of four titles.

1/1

- 27 -

TARASOV, N. M., Candidate of Engineering Sciences, and TSEKHMISTER, I. M., and BARUKHA, N. A., Engineers, Kharkov Aviation Institute

"Spot Welding With Peripheral-Zone Compression"

Abstract: An improved method of spot welding has been proposed (Author's Certificate No 354956) by the Kharkov Aviation Institute. A steel die is used which is pressed by a current-conducting rod on a copper strip previously soldered or tack welded to the piece being welded. Spot welds made with this method were stronger than without compression. The dent made by the electrode is larger when using the compression method, but this is the result of metal shrinkage during solidification and not electrode pressure. Thus, for spot welding of steels with compression of the peripheral zone of the spot the dent from the electrode is significantly diminished, joint deformation decreased, and decorative appearance improved. Welding with compression increases the weld zone in the plastic state and increases joint strength and its stability. Welding with compression requires increased electrode pressure, more careful placement of the electrodes, and their centering and alignment. Six figures, 3 bibliographic references.
1/1

USSR   UDC: 536.24:532.54

BARULIN, Yu. D., VIKHREV, Yu. V., DYADYAKIN, B. V., KOBLYAKOV, A. N.,
KON'KOV, A., LOKSHIN, V. A., SINITSYN, I. T., Editorial Staff of _Inzh._
fiz. zh., Academy of Sciences of the Belorussian SSR

"Heat Exchange During Turbulent Flow of Water With Supercritical Parameters
of State in Vertical and Horizontal Pipes"

Teplootdacha pri turbulentnom techenii v vertikal'nykh i gorizontal'nykh
trubakh vody sverkhkriticheskikh parametrov sostoyaniya (cf. English above),
Minsk, 1970, 16 pp, ill. (No 2315-70 Dep.) (from _RZh-Mekhanika_, No 4, Apr
71, Abstract No 4B739 DEP)

Translation: The paper presents the results of an experimental study of
heat transfer during rising, descending and horizontal flow of water with
supercritical parameters of state in circular tubes. The experimental
values of the coefficients of heat transfer were found in the following
ranges of working parameters: pressure 225-265 bars; mass flowrates 480-
-5000 kg/cm^2·s; Reynolds number (12.5-450)·10^3; specific thermal load 0.2-
-6.5 MW/m^2; flow temperature +50-500°C; wall temperature +60-750°C; inside

1/2

- 60 -

BARULIN, Yu. D. et al., Teplootdacha pri turbulentnom techenii v verti-
kal'nykh i gorizontal'nykh trubakh vody sverkhkritichskikh parametrov
sostoyaniya, Minsk, 1970 (No 2315-70 Dep.)

diameter of the tubes $(3, 8, 20) \cdot 10^{-3}$ m; relative length up to 300. Ex-
perimental data are obtained on the effect which the direction of motion
of the liquid flow has on heat exchange in the supercritical region. A
study is made of the nature of the change in the coefficient of heat ex-
change on the initial section and around the perimeter of horizontal tubes.
Bibliography of twelve titles. Authors' abstract.

2/2

USSR   UDC: 621.376.56(088.8)

POPOV, S. G., BARUZDIN, V. I.

"A Magnetic Pulse Duration Modulator"

Translation: This Author's Certificate introduces a magnetic pulse duration
modulator for controlling a thyristor current regulator. The device contains
a transformer with leads of a two-section winding connected through resistors,
saturation chokes and diodes to the controlling electrodes of the thyristors,
and the common tap from the transformer sections connected to the negative
lead of the thyristor current regulator. To increase the steepness of the
leading edges of the output pulses, a switching element such as a dynistor
is connected between the common tap of the transformer secondary and the
negative lead of the thyristors in the current regulator in series with a
resistor. V. P.

1/1

Reliability

USSR

UDC 621.396.6.019.3

BARVINSKIY, L. L., DEM'YANCHUK, V. S., MEDVEDEV, K. I.

"Availability of Certain Repairable and Maintainable Redundant Systems"

Sb. nauch. tr. Kiev. in-t inzh. grazhd. aviatsii (Collected Scientific Works of Kiev Institute of Civil Aviation Engineering), 1970, vyp. 3, pp 25-29 (from RZh-Radiotekhnika, No 5, May 72, Abstract No 5V292)

Translation: Expressions were obtained for evaluating the idle time factor of a complex comprising redundant subsystems and subjected to repair and preventive maintenance. It is proposed that all modules of the system are equally reliable and that their repair time is distribuutd by an exponential law. The repair time for a failed module and the switching time to a reserve unit in a state of good repair are distributed by a power law. The time to ready the redundant unit for operation is taken into account. There is 1 illustration and a 1-entry bibliography.

1/1

1/2   024   UNCLASSIFIED   PROCESSING DATE--13NOV70
TITLE--OPTIMAL REDUNDANCY WITH COST AS CRITERION -U-

AUTHOR-(02)-BARVINSKIY, L.L., DEMYANCHUK, V.S.

COUNTRY OF INFO--USSR

SOURCE--IZV. VUZ RADIOELEKTRONIKA (USSR), VOL. 13, NO. 1, P. 97-9 (JAN.
1970)

DATE PUBLISHED----JAN70

SUBJECT AREAS--BEHAVIORAL AND SOCIAL SCIENCES, NAVIGATION

TOPIC TAGS--COST ESTIMATE, COMMUNICATION CHANNEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--3005/1805   STEP NO--UR/0452/70/013/001/0097/0099

CIRC ACCESSION NO--AP0133710

UNCLASSIFIED

2/2   024   UNCLASSIFIED   PROCESSING DATE--13NOV70

CIRC ACCESSION NO--AP0133710

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. A MULTICHANNEL SYSTEM, CONSISTING OF M MAIN AND N REDUNDANT CHANNELS IS ANALYSED WITH A VIEW TO DETERMINING THE OPTIMUM NUMBER N SUB0 OF REDUNDANT CHANNELS, TAKING THE LEAST OVERALL COST OF THE SYSTEM AS CRITERION. AN EXPRESSION IS DERIVED FOR N SUB0. TABULATED RESULTS SHOW THAT THE LOSS PER HOUR VERSUS IDLE TIME OF THE SYSTEM DECREASES RAPIDLY AS THE NUMBER OF REDUNDANT CHANNELS INCREASES; AT THE SAME TIME THE RUNNING AND SERVICING COSTS RISE LINEARLY.

UNCLASSIFIED

USSR   62-531.6

BARYAKH, B. M. and GRANBERG, G. Ya. /"Tyazhpromavtomatika" Ukraini-
an State Design Institute/

"Device for Reversible Control of a Single-Phase Condenser Motor"

USSR Author's Certificate No 294217, filed 13 Jan 69, published
21 May 71 (from RZh-Avtomatika, telemekhanika i vychislitel'naya
tekhnika, No 12, 1971, Abstract No 12A174P)

Translation: A known device for reversible control of a single-
phase condenser motor with two unconnected windings contains a
flip-flop with two oppositely connected thyristors. The invention
can be used as an automatic control element and a remote transmit-
ter. The proposed device provides a reduction in the distortion
of the shape of the voltage applied to the control winding of the
motor and, consequently, results in an increase in efficiency. This
is achieved by equipping the secondary winding of the flip-flop
with a center tap, with one of the motor windings connected be-
tween the tap and the thyristor cathodes. Each of the thyristors
is connected in antiparallel to a diode, and other free taps on the secondary
winding of the flip-flop are connected to the outputs of the generated power
unit through capacitors. Resume.
1/1

- 14 -

USSR   UDC: 658.562.012.7

BARYAKH, B. M., GRANBERG, G. Ya., LERNER, I. U., SLOTSNIK, Ya. Yu., TSIV'YAN, B. Kh.,
CHERNKOV, V. V.

"Device for Centralized Testing of Parameters of an Object"

USSR Author's Certificate Number 308433, filed 16/03/70, published 12/08/71 (trans-
lated from Referativnyy Zhurnal Avtomatika, Telemekhanika i Vychislitel'naya
Tekhnika, No 3, 1972, Abstract No 3 A371 P)

Translation: A device is suggested for centralized testing of the parameters of
an object, containing a unit for selection of parameters, an autocompensator with
a servo system, a rotation-digital converter, a unit for checking the accuracy
of the servo system of the autocompensator, a defect indicator, a counter unit,
and a recorder. In order to increase the speed and reliability of testing, the
device contains a threshold unit connected to the input of the rotation-digital
converter and a self-testing unit in the servo system, and the output of the
threshold unit is connected to one input of the self-testing unit of the servo
system, the second input of which is connected to an additional output of the
unit for selection of parameters; the output of the counting control is connected

1/2

USSR

BARYAKH, B. M., GRANBERG, G. Ya., LERNER, I. U., SLOTSNIK, Ya. Yu., TSIV'YAN, B. Kh., CHERNKOV, V. V., USSR Author's Certificate Number 308433, filed 16/03/70, published 12/08/71 (translated from Referativnyy Zhurnal Avtomatika, Telemekhanika i Vychislitel'naya Tekhnika, No 3, 1972, Abstract No 3 A371 P).

to the input of the counting unit, the output of the false balance checking unit is connected to the controlling input of the servo system balancing element, while the output of the signalling unit is connected to the additional inputs of the defect indicator and recorder. 2 figures.

2/2

- 11 -

USSR

UDC: 669.25:539.67

BAR'YAKHTAR, F. G., DATSKO, O. I., KUSHNEREV, V. I., PILIPENKO, N. P., POGORELOV, V. A. and YABLUKOV, B. G., Donetsk Physicotechnical Institute.

"Study of the Internal Friction of Cobalt Near 300°C"

Abstract: Earlier research indicates the 300°C region as the position of low-frequency maximum internal friction for cobalt. Described here is an attempt to explain its nature and properties. The experiment involved machined specimens of 99.98% pure Co measuring 3x40 mm and specimens additionally deformed by drawing (by 8%). The specimens were gradually annealed at 300, 600 and 900°C and cooled down to room temperature. The measurements included internal friction (150-350°C), oscillation frequency (7 cps) and maximal shearing strains ($2 \cdot 10^{-6}$). Interrupted anneal of the material appears to lower the maximum friction temperature position which is most pronounced at 900°C and particularly manifest on the drawn specimen. The relationship between the temperature position of maximum internal

1/2

USSR

BAR'YAKHTAR, F. G., et al, Fizika metallov i metallovedeniye, Vol 32, No 5,
Nov 71, pp 1101-1104

friction of Co, the thermomechanical treatment of the material and the
conditions of polymorphous transformation indicate its close association
with crystal lattice defects, i.e., the maximum internal friction of Co
at 300°C is of deformational nature. It is most likely to be caused by
the plastic deformation of the material, including polymorphous transforma-
tion of Co. (2 illustrations, 3 bibliographic references).

2/2

USSR

AKHIYEZER, A. I., AKHIYEZER, I. A., BAR'YAKHTAR, V. G. (Physicotechnical
Institute of the Ukrainian Academy of Sciences)

"Electron-Electron Collisions and Electrical Conductivity of Metals at Low
Temperatures"

Abstract: The contribution of electron-electron collisions to the resistance
of pure metals at low temperatures is determined. It is shown that due to
compensation of coulomb repulsion of electrons and their attraction due to
virtual phonon exchange, the effective interaction between the electrons is
appreciably decreased. Consequently, the contribution of electron-electron
collisions to the resistance of a number of metals is proportional to T^6
in a broad temperature range (and not to T^2 as predicted by the Landau-
Pomeranchouk theory; T is the metal temperature).

1/1

USSR   UDC:

AKHIYEZER, A. I., BAR'YAKHTAR, V. G., and KVIRIKADZE, A. G., Kharkov State University imeni A.M. Gor'kiy

"Parametric Excitation of Hypersound in Ferromagnetics"

Abstract: The authors calculate the increment of hypersound which is caused by the oscillations of a magnetic moment of large amplitude. It is shown that in a temperature range one order of magnitude less than the Debye temperatures the increment can exceed the sound damping constant. Original article: 11 formulas and seven bibliographic entries.

1/1

USSR

BAR'YAKHTAR, V. G., BOROVIK, A. Ye., and POPOV, V. A.

"Theory of the Intermediate State of Antiferromagnetic Objects"

Abstract: The theory of the intermediate state of antiferromagnetics
in an external field is given in this article. Beginning their ana-
lysis with an expression for the various phases that can occur in
antiferromagnetics, depending on the direction and magnitude of the
external magnetic field, the authors develop a theory of perturba-
tions through which the magnetic moment distribution in the inter-
mediate state can be found with any degree of accuracy. Results of
the theory for the case in which the antiferromagnetics has the form of
an ellipsoid are given under the assumption that the magnetic moment
and antiferromagnetism vectors are in uniform distribution. Also
considered is the nonuniform distribution of these vectors in a
plate, where the free antiferromagnetic energy is varied with re-
spect to the vectors. Expressions are obtained for the energy of
the intermediate state and for the domain dimensions. The authors
thank A. I. Akhiyezer and V. V. Yeremenko for their comments; they
are associated with the Physico-Technical Institute for Low Tempera-
tures, Ukrainian Academy of Sciences.
1/1

USSR

BAR'YAKHTAR, V. G., KLEPIKOV, V. F., and SOBOLEV, V. L. (Khar'kov State University)

"Ground States and Nuclear Magnetic Resonance in Thin Magnetically Ordered Films"

Leningrad, Fizika Tverdogo Tela, May 1971, pp 1454-1462

Abstract: The ground state of a thin magnetically ordered film in which the character of the surface magnetic anisotropy is different from the character of the voluminal magnetic anisotropy was studied. The distributions of the magnetic intensity of a ferromagnetic film as well as the vectors of the anti-ferromagnetism and magnetic intensity of an antiferromagnetic film in the ground state was determined. These distributions are described by Jacobian elliptic functions. The static local and integral magnetic susceptibility of a film were calculated, and it was shown that for given thicknesses of the film a phase magnetic transition of the second kind occurs, during which the components of the tensor of magnetic susceptibility undergo an abrupt change. The amplification factors of the nuclear magnetic resonance were calculated.
1/1

- 36 -

USSR -

BAR'YAKHTAR, V. G., BOROVIK, A. YE., POPOV, V. A., and STEFANOVSKIY,
YE. P., Physicochnemical Institute of the Academy of Sciences Ukrainian
SSR

"The Domain Structure of an Antiferromagnet Resulting From Variations
in the Character of the Magnetic Anisotropy"

Moscow, Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 59, No
4, Oct 70, pp 1299-1306

Abstract: The article considers the case of the phase transition
(with respect to temperature) of the first kind $\phi_{\parallel} \rightleftarrows \phi_{\perp}$.
Distributions are obtained for antiferromagnet sublattice magnetic
moments at the interfaces of phases $\phi_{\parallel}$ and $\phi_{\perp}$ (90° bound-
ary), as well as 180° domain boundaries in antiferromagnets with weak
ferromagnetism. The surface energies of the 90 and 180° domain walls
are calculated, and the domain structures for a plane-parallel plate
are determined and domain sizes estimated. It is shown that a thermo-

1/2

USSR

BAR'YAKHTAR, V. G., et al., Zhurnal Eksperimental'noy i Teoretiches-
koy Fiziki, Vol 59, No 4, Oct 70, pp 1299-1306

dynamically stable domain structure may occur in the phase transition
due to weak ferromagnetism of the phase with magnetic anisotropy of
the "easy plane" type. The surface energy of the 90^0 domain bound-
ary is significantly less than that of the 180^0 domain boundary.
However, the surface energy of the 180^0 interface declines signifi-
cantly as the phase transition temperature is approached and becomes
on the order of the 90^0 interface.

The authors thank A. I. AKHIYEZER, A. S. BOROVIK-ROMANOV and
V. V. YEREMENKO for discussing the results.

2/2

Acc. Nr: *AP0043583*   BARYAKHTAR V.G.

Ref. Code: UR 0056

LOW FREQUENCY ANTIFERROMAGNETIC RESONANCE IN COPPER CHLORIDE DIHYDRATE AND PHASE TRANSITIONS

V. G. Baryakhtar, A. A. Galkin, S. N. Kovner, V. A. Popov

Antiferromagnetic resonance in a $CuCl_2 \cdot 2H_2O$ single crystal is investigated at frequencies of 5.2, 3.0, 1.1 and 0.65 Gc/s. The dependence of resonance fields corresponding to frequencies 3 and 0.65 Gc/s on temperature is measured at temperatures between 1.52 and 4.2° K. The resonance field corresponding to the frequency 0.65 Gc/s and the larger of the resonance fields corresponding to the frequency 3 Gc/s within the experimental errors vary with temperature just as the overturning field of the sublattice magnetic moments does. The magnetic moment homogeneous oscillation frequencies in an antiferromagnet separated into domains are calculated. A phase equilibrium diagram is proposed for $CuCl_2 \cdot 2H_2O$ in a magnetic field parallel to the «easy» axis. The temperature dependence of the lability fields is calculated in the spin wave theory approximation.

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REEL/FRAME
19762055

18 DI

TITLE--DENSITY OF SPIN WAVE STATES IN AN ANTIFERROMAGNET -U-

AUTHOR-(03)-BARYAKHTAR, V.G., POPOV, V.A., KVIRIKADZE, A.G.

COUNTRY OF INFO--USSR

SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(1), 167-9

DATE PUBLISHED-------70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--ANTIFERROMAGNETIC MATERIAL, ANTIFERROMAGNETIC THEORY, SPIN
WAVE, SPIN WAVE THEORY, EXTERNAL MAGNETIC FIELD, CHARGE DENSITY, LIGHT
ABSORPTION, LIGHT SCATTERING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1992/1449   STEP NO--UR/0185/70/015/001/0167/0169

CIRC ACCESSION NO--AP0112443
                    UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0112443

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE EFFECT WAS STUDIED OF AN
EXTERNAL MAGNETIC FIELD ON THE D. OF STATES FOR SPIN WAVES IN
ANTIFERROMAGNETS. THE D. OF STATES CHANGES IN FIELDS OF THE ORDER OF
THE EXCHANGE INTEGRAL. THIS CHANGE CAN BE OBSD. EXPTL. BY STUDYING THE
ABSORPTION AND SCATTERING OF LIGHT OR OF SLOW NEUTRONS.
FACILITY: FIZ.-TEKH. INST., KHARKOV, USSR.

UNCLASSIFIED

TITLE--PARAMETRIC EXCITATION OF SOUND BY A UNIFORM MAGNETIC FIELD IN
  FERROMAGNETIC SAMPLES -U-
AUTHOR-(02)-BAKAY, A.S., BARYAKHTAR, V.G.

CCUNTRY OF INFO--USSR

SOURCE--ZHURNAL EKSPERIMENTAL'NOY I TEORETICHESKOY FIZIKI, 1970, VOL 58,
  NR 4, PP 1342-1347
DATE PUBLISHED------70

SUBJECT AREAS--PHYSICS

TOPIC TAGS--FERROMAGNETIC MATERIAL, PARAMETRIC OSCILLATOR, ALTERNATING
  MAGNETIC FIELD, HIGH FREQUENCY, EXCITATION SPECTRUM, ACOUSTIC VIBRATION,
  MAGNETIC FIELD EFFECT

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1988/1569   STEP NO--UR/0056/70/058/004/1342/1347

CIRC ACCESSION NO--AP0106315
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0106315

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. PARAMETRIC EXCITATION OF SOUND BY
A HIGH FREQUENCY UNIFORM FIELD IN A FERROMAGNET IS INVESTIGATED. THE
SOUND PARAMETRIC EXCITATION THRESHOLD, STATIONARY CONDITIONS BEHIND THE
THRESHOLD AND THEIR TRANSIENT PERIOD ARE FOUND. THE DEPENDENCE OF THE
MAGNETIC MOMENT OSCILLATION FREQUENCIES ON AMPLITUDE ARE TAKEN INTO
ACCOUNT. A COMPARISON WITH THE EXPERIMENTAL DATA IS MADE.
FACILITY: FIZIKO TEKHNICHESKIY INST. AN UKR. SSR.

UNCLASSIFIED

1/2   019

UNCLASSIFIED

PROCESSING DATE--13NOV70

TITLE--PRODUCTION OF NEW BRANDS OF VERY FINE TRANSFORMER STEEL -U-

AUTHOR-(05)-AFANASYEV, S.V., BARYATINSKIY, V.P., GORBACHEV, V.N., YELTS...,
YU.V., KOVALEV, P.M.

COUNTRY OF INFO--USSR

SOURCE--IZV. AKAD. NAUK SSSR, SER. FIZ. 1970, 34(2), 272-5

DATE PUBLISHED--------70

SUBJECT AREAS--MECH., IND., CIVIL AND MARINE ENGR, MATERIALS

TOPIC TAGS--TRANSFORMER STEEL, METAL ROLLING, ELECTRICAL PROPERTY, STEEL
MANUFACTURE PROCESS, STEEL SHEET, ANNEALING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1994/1936

STEP NO--UR/0048/70/034/002/0272/0275

CIRC ACCESSION NO--AP0115745

UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0115745   PROCESSING DATE--13NOV70

ABSTRACT/EXTRACT--(U) GP-0-   ABSTRACT. THE TECHNOLOGY USED IN MANUFG.
VERY FINE, ORIENTED TRANSFORMER STEEL SHEET (0.05-0.15 MM THICK) FOR
INSTRUMENTS AND APP. UTILIZING A WIDE RANGE OF FREQUENCIES IS GREATER
THAN OR EQUAL TO 400 HZ DIFFERS IN MANY ASPECTS FROM THE CONVENTIONAL
TECHNOLOGY USED FOR HEAVIER GAGE SHEET (0.2-0.5 MM), AS THE FINE SHEET
IS MADE GENERALLY FROM HEAVIER GAGE, COLD ROLLED SHEET OF AN ORIENTED
TEXTURE RATHER THAN FROM NONORIENTED MATERIAL. IN THE COURSE OF MANUFG.
THE FINE SHEET, THE (110) (001) TEXTURE OF THE THICKER TRANSFORMER SHEET
IS TRANSFORMED BY COLD ROLLING INTO A DEFORMATION TEXTURE (111) MEAN
VALUE OF 112 WHICH AGAIN IS CHANGED TO 1KO MEAN VALUE OF 001 BY
SUBSEQUENT ANNEALING, K DEPENDING ON THE DEFORMATION RATIO AND THE TEMP.
OF THE ISOTHERMAL ANNEAL. THUS, THE FINAL TEXTURE IS THAT FORMED BY
PRIMARY RECRYSTN.; ITS DEGREE OF PERFECTION (WHICH DETS. THE MAGNETIC
PROPERTIES OF THE MATERIAL) DEPENDS ON THE INITIAL TEXTURE AND GRAIN
SIZE (BEFORE ROLLING), THE DEFORMATION RATIO APPLIED, AND THE TEMP. AND
DURATION OF FINISH ANNEALING.   SECONDARY RECRYSTN. IS SUPPRESSED SINCE
IT WOULD BRING ABOUT TEXTURE DETERIORATION. ANNEALING AT
950-1000DEGREES FOR A PERIOD OF TIME NOT EXCEEDING THE INCUBATION PERIOD
OF SECONDARY RECRYSTN. (20 SEC) OR CONTROLLED ANNEALING PERMITTING
LONGER EXPOSURES TO HIGH TEMPS. IS RECOMMENDED; THE FORMER TREATMENT MAY
NOT BE FOLLOWED BY A SECONDARY ANNEAL. THE TECHNOLOGICAL GUIDELINES
GIVEN PERMIT THE MANUF. OF FINE SHEET EXHIBITING SP. CORE LOSSES OF
SIMILIAR TO 12W-KG.   FACILITY: TSNIICHM IM BARDINA, MOSCOW,
USSR.

UNCLASSIFIED

TITLE--SECONDARY RECRYSTALLIZATION IN COLD ROLLED SILICON STEEL ALLOYED IN THE ANNEALING PROCESS -U-

AUTHOR-(05)-AFANASYEV, S.V., BARYATINSKIY, V.P., GORBACHEV, V.N., KRYZHANOVSKIY, V.V., MOLOTILOV, B.V.

COUNTRY OF INFO--USSR

SOURCE--IZV. AKAD. NAUK SSSR, SER. FIZ. 1970, 34(2), 276-80

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR

TOPIC TAGS--SILICON STEEL, METAL RECRYSTALLIZATION, COLD ROLLING, TRANSFORMER STEEL, ALLOY COMPOSITION, METAL TEXTURE, HIGH QUALITY STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1995/0190   STEP NO--UR/0048/70/034/002/0276/0280

CIRC ACCESSION NO--AP0115894
                          UNCLASSIFIED

CIRC ACCESSION NO--AP0115894

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE PROCESS OF SECONDARY RECRYSTN. IN THE PRESENCE OF S WAS STUDIED ON COLD ROLLED, HIGH PURITY TRANSFORMER STEEL SHEET 0.05, 0.08, AND 0.10 MM THICK TO DET. THE EFFECTS OF THE PRIMARY STRUCTURE, HEAT TREATMENT CONDITIONS, AND THE S CONTENT ON THE FINAL PRODUCT. THE STEEL CONTAINED C 0.007, MN 0.08, SI 3.05, P 0.006, S 0.0025, NI 0.04, CR 0.01, CU 0.05, AL 0.01, AND N 0.0107PERCENT. ALLOYING THE THIN SHEET IN THE ANNEALING PROCESS MADE IT POSSIBLE TO CONTROL THE SECONDARY RECRYSTN. THE STRUCTURE AND TEXTURE OF THE SECONDARY MATRIX DEPENDED ON BOTH THE INITIAL STRUCTURE AND THE AMT. OF S INTRODUCED BY DIFFUSION. AT RELATIVELY LOW S CONCNS. THE SECONDARY RECRYSTN. DEVELOPED A RIBBED TEXTURE WHEREAS AT HIGHER S CONCNS. IT RESULTED IN AN ORIENTATION NEAR (111) (110). A PRELIMINARY RECRYSTN. OWING TO HEAT TREATMENT AND A SUBSEQUENT STABILIZATION OF THE PRIMARY MATRIX BROUGHT ABOUT THE FORMATION OF A MORE PERFECT TEXTURE IN SECONDARY RECRYSTN.   FACILITY: TSNIICHM IM. BARDINA, MOSCOW, USSR.

UNCLASSIFIED

BARYBIN, A.A.

- 140 -

JPRS 59208
6.73

5

X-8. EXPERIMENTAL STUDY OF THE DISTRIBUTION OF THE ADMIXTURES IN MULTILAYERED
FILM STRUCTURES OF GALLIUM ARSENIDE GROWN BY THE METHOD OF LIQUID EPITAXY

[Article by A. A. Barybin, A. A. Zakharov, L. V. Kostyreva, N. K. Nedev,
V. M. Prigorovskiy, Leningrad; Novosibirsk, III Simpozium po...
Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June
1972, p 136]

This paper contains a discussion of the results of an experimental study
of the admixture distribution in film structures of GaAs of the n-n⁺, n-π-
n⁺, p-n-π type and others grown from the melt-solutions using forced cooling
and using a temperature gradient. The conditions of epitaxial growth of the
films are the following: the saturation temperature of the solution-melt is
800° to 900°C, the cooling rate is 1-5 deg/min, the temperature gradient is
2-10 deg/mm. Tin, germanium and zinc were used as the allowing admixtures.
The distribution of the admixtures in the structures obtained was investigated
by the known volt-farad and sonde methods and also using the chemical decora-
tion procedure developed for gallium arsenide. The research demonstrated that
depending on the conditions and the growth regime, sharp transitions of the
admixture concentration are obtained between the layers and also structures
with intermediate high-resistance and low-resistance layers. It was discovered
that when using the temperature gradient method, a more uniform distribution
of the admixture is obtained with respect to the thickness of the layers.
The measurement results obtained by different methods agree quite well with
each other.

USSR

UDC 537:226:537:311;33]:538

BARYBIN, A. A.

"Interaction of Helicon and Spin Waves With Ferromagnetic Semiconductors"

Vzaimodeystviye gelikonnykh i spinovykh voln v ferromagnitnykh poluprovodnikakh, [English version above] (Editors of Radiotekhn. i elektronika [Radio Engineering and Electronics], Academy of Sciences, USSR), Moscow, 1970, 13 pages, (Translated from Referativnyy Zhurnal Fizika, No 10, 1970, Abstract No 10 Ye 1170 DEP by the author).

Translation: The method of coupled waves is used to study the interaction of helicon and spin waves. For this, the fields and currents of each of the interacting systems are represented as sums of internal and external fields and currents, allowing the derivation of excitation equations for the helicon and spin waves by external sources. By means of the small-signal energy theorem proved earlier, the powers carried by the helicon and spin waves are calculated, and it is determined that the coupling between these waves, expressed as a periodic interchange in power between the interacting waves, is passive in nature jand does not lead to amplification of the spin waves.

1/1

USSR   UDC 537.311.33

BARYBIN, A. A.

"Effect of Diffusions and Collisions on Longitudinal Waves in Drifting Flows of Charge Carriers"

Vliyaniye diffuziy i stolknoveniy na prodol'nyye volny v dreyfovykh potokakh nositeley zaryada (cf. English above. Editorial Board of the Journal "Radiotekhn. i elektronika," AS, USSR), Moscow, 1970, 15 pp (from RZh-- Elektronika i yeye primeneniye, No 5, May 1971, Abstract No 5B13 DEP)

Translation: Equations of a quasihydrodynamic approximation are used for a study of longitudinal waves in nondegenerate semiconductor plasma. On the basis of a small signal energy theorem demonstrated earlier, the accumulated energy and power transmitted by the longitudinal waves are calculated. The energy characteristics and dispersion equation obtained are studied for individual special cases with the object of clarification of the role of diffusion and collisions of carriers with the lattice, in the process of propagation of longitudinal waves in plasma. Author's Abstract.

1/1

USSR   UDC 537:226+537:311:33]:[537+535

BARYBIN, A. A.

"Small-Signal Energy Theorem for Movement of Carriers in a Solid Plasma"

Malosignal'naya energeticheskaya teorema dlya dvizheniya nositeley v
plazme tverdogo tela., [English version above] (Editors of Radiotekhn. i
elektronika [Radio Engineering and Electronics], Academy of Sciences, USSR,
Moscow, 1970, 16 pages, (Translated from Referativnyy Zhurnal Fizika, No 10,
1970, Abstract No 10 Ye 1013 DEP by the author).

Translation: A system of small-signal equations consisting of the Maxwell
equations; equations describing the movement of carriers in polarization
variables considering collisions, diffusion, and recombination; the equations
of motion of magnetization in a ferromagnetic, and equations describing the
motion of an elastic piezoelectric medium are used to derive an energy
theorem. The energy theorem concern   the mean stored energy, consisting
of the electrical magnetic energy, electrokinetic energy of carriers; the
energy stored in acoustical oscillations of the elastic medium and in spin
oscillations of magnetization of the medium; the coupling energy of carriers
with external fields; the coupling energy of acoustical oscillations with
electrical fields and spin oscillations with magnetic fields; the average
power carried, consisting of the electromagnetic power, the electrokinetic

USSR

UDC 537:226+537:311:33]:[537+535

BARYBIN, A. A., Malosignal'naya energeticheskayá teorema dlya dvizheniya nositeley v plazme tverdogo tela., [English version above], (Editors of Radiotekhn. i elektronika [Radio Engineering and Electronics], Academy of Sciences, USSR, Moscow, 1970, 16 pages.

power carried by charge carriers, the power carried by acoustical and spin waves, the power resulting from coupling of carriers with external fields; the average loss power, consisting of the power of losses resulting from collisions of carriers with the lattice and current losses resulting from processes of recombination, the power of magnetic losses related to relaxation processes in the ferromagnetic crystal. The small-signal energy theorem proven allows investigations to be performed into the energy characteristics of waves in various systems and can be used as a basis for energy analysis of coupled waves in the design of various SHF devices using solid state plasmas.

BARYBIN, A.A.

JPRS 59265
6.73

11-3. STUDY OF THE THERMODYNAMIC CONDITIONS OF GROWTH OF EPITAXIAL FILMS OF
GALLIUM ARSENIDE IN THE GaAs-H$_2$O-H$_2$ SYSTEM (I)

[Article by A. A. Barybin, A. A. Zakharov, N. E. Medov, Leningrad; Novosibirsk,
[1] Simposium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i
Plenok, Kuzbas, 12-17 June, 1972, P 11]

The thermodynamics of the process of growth of gallium arsenide films in
the GaAs-H$_2$O-H$_2$ system were studied in papers by Michelitsch [1] and Gottlieb
[2]. In the given paper a study has been made of the thermodynamic analysis
of the chemical transport of gallium arsenide by water vapor in order to select
the optimal conditions of growth of epitaxial films. For this purpose, along
with the basic chemical reaction proceeding with the formation of the volatile
oxide Ga$_2$O, a study was made of two competing reactions disturbing the
stoichiometric gas composition; one is with the formation of the nonvolatile
oxide Ga$_2$O$_3$, and the other, with the formation of liquid gallium. The calcu-
lation results on a computer permitted the selection of the range of stoichiometric
compositions of the gas phase bounded by the operating temperature range of
650-900°C and the partial pressure of water from 0.1 to 30 mm Hg. Outside the
indicated region at low temperatures, Ga$_2$O$_3$ is formed, and at high temperatures,
liquid gallium. The experimental studies confirmed the calculation results.
The application of exact calculation of the gas phase considering the competing
reactions permitted the selection of the optimal conditions of the epitaxial
process.

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1. M. Michelitsch, et al., J. Electrochem. Soc., No 111, 1248, 1964 (Russian
    translation in the collection Metallurgiya v elektronike [Metallurgy in
    Electronics], Izd-vo Metallurgiya, Moscow, 189, 1970).

2. G. E. Gottlieb, J. Electrochem. Soc., No 112, 192, 1965.

- 12 -

(3)

BARYBIN, A A.

SPPS 59968
6-73

3

V-10. STUDY OF THE KINETICS OF CHEMICAL TRANSPORT OF GALLIUM ARSENIDE IN THE
GaAs-H$_2$O-H$_2$ (II) SYSTEM

Calculation of the composition of the gas phase and selection of the
thermodynamic conditions of the epitaxial growth of GaAs films offer the
possibility of defining the diffusion mass transfer rate by the Lever-Mandel
theory. The experimental study of the growth rate of GaAs films and comparison
of it with the calculated values permitted us to find the growth resistance of
the crystal caused by the finite rate of the heterogeneous processes on the
surface of the source and the substrate. It turned out that under actual condi-
tions the rate of the heterogeneous surface reactions is on the same order as
the rate of diffusion mass transport. The measurements of the growth rate on
the substrates with different orientation — (111), (110), (100) — have the
range of operating supersaturations ΔG = (0.5-1) kcal/mole. The greatest growth
rate and the least operating supersaturations were observed on substrates with
(111) orientation, and the least rate and greatest supersaturations on substrates
with (100) orientation.

- 61 -

BARYBIN, A.A.

JPRS 59068
6-73

3

V-15. EXPERIMENTAL STUDY OF THE HETEROEPITAXIAL GROWTH CONDITIONS OF GALLIUM ARSENIDE FILMS ON DIELECTRIC SUBSTRATES

[Article by A. A. Barybin, A. A. Zakharov, H. K. Nedev, Leningrad; Novosibirsk, III Simpozium po Protsessam Rosta i Sinteza Poluprovodnikovykh Kristallov i Plenok, Russian, 12-17 June, 1972, p 66]

In this paper the results of an experimental study of the growth of GaAs films on monocrystalline substrates of Al_2O_3, MgO and $Y_3Al_5O_{12}$ are discussed. The films were grown by the chemical transport method in the $GaAs-H_2O-H_2$ system on substrates with the following orientation: $\alpha-Al_2O_3-(0001)$, $(11\bar{2}0)$, $(11\bar{3}0)$, $(11\bar{3}2)$; MgO-(001): $Y_3Al_5O_{12}-(100)$, (110), (111). The different methods and conditions of chemical treatment of the dielectric substrates were tested and processed. In the experiment it was discovered that the higher quality films were obtained on substrates with advance application of a thin layer (0.3-0.5 microns) of Ga in alloy (9:1). The optimal results were obtained at substrate temperature of 850° to 950°C, a source temperature 10-50 degrees higher and a partial vapor pressure of water (4-20) mm Hg. The x-ray diffraction and electron diffraction analysis demonstrated that the GaAs films had in the majority of cases mono-crystalline or lump structure. The best film structures are obtained on the substrate planes indicated below with the following crystallographic correspondences: (0001) $Al_2O_3\,||\,(111)$GaAs, $(11\bar{2}0)Al_2O_3\,||\,(100)$GaAs, (001) MgO$||$(001)GaAs, (100) $Y_3Al_5O_{12}\,||\,(100)$GaAs, $(111)Y_3Al_5O_{12}\,||\,(111)$GaAs. The electrophysical parameters of the films are the following: ρ-type $n = (10^{15}-10^{16})cm^{-3}$, n-type $n = (10^{15}-10^{16})cm^{-3}$, $\mu_n = (2000-2500)$ cm²/v-sec.

USSR

UDC 631.542.25

BAR'YETAS, P. K., OTEMISOV, T., Institute of Experimental Plant Biology of the
Uzbek SSR Academy of Sciences

"Penetration of Defoliants into Cotton Seed"

Moscow, Khimiya v sel'skom Khozyaystva, No 8, 1972, pp 43-46

Abstract: A study was made of the residual amounts of defoliants in cotton
seed. Magnesium chlorate and butylcaptax, defoliants with a contact action,
penetrate into the kernel of the cotton seed. The penetration rate of these
compounds depends on the physiological state (age) of the bolls and also on
the dosage of the compound and the air temperature. During manifestation of
protective properties of the plant, the quantity of defoliants in the seeds
gradually drops apparently as a result of its detoxication. Detoxication is
accelerated at high temperatures. Butylcaptax was detected in the cotton seed
kernels primarily in metabolized form. About 5-10% of the radioactivity of a
35S tag was in the aliphatic fraction (ether extract) -- a lipophilic product
of conversion of butylcaptax. The primary radioactivity (90-95%) was dis-
tributed among the remaining three fractions of the kernels: water-soluble
metabolites (35-40%), water soluble proteins (20%) and dry solid residue (30-
35%). In the experiments magnesium chlorate [$Mg(ClO_3)_2 \cdot 6H_2O$] was used in the
1/2

- 58 -

USSR

BAR'YETAS, P. K. and OTEMISOV, T., Khimiya v sel'skom Khozyaystva, No 8, 1972, pp 43-46

amounts of 12 and 30 kg/hectare, and butylcaptax (2-butylthiobenzothiazol) was used in the amount of 10 kg/hectare.

2/2

USSR

BARYKIN, K., and TUNKEL', I., Special Ogonek Correspondents

"A Second Birth?"

Moscow, Ogonek, No 50, Dec 71, p 11

Translation: This is a severe disease. It attacks the newborn baby, the tiny defenseless person, and does not let go. "The treatment is ineffective," prominent physician note. Yes, up till now this disease could not be arrested. The first successful steps in the fight against it have been made only now in the department of the academician of the Academy of Medical Sciences USSR Yuriy Mikhaylovich Lopukhin...

The 5-year old Petya was brought to Professor Lopukhin's clinic from the Pediatric Neurological Department of the Second Moscow Medical Institute. The instability in the boy's walking began to progress rapidly from the age of $3\frac{1}{2}$. He had barely learned to walk, but his relatives were not able to rejoice at his first steps. It seemed that only yesterday his grandmother said: "Look, look, he is walking!" But today the boy did not get up from his bed.

With every passing day his motor coordination became increasingly impaired and his slow speech became more slurred. This was terrible. A human being was just beginning to live, but even happy children's games were not accessible to him...

1/2

USSR

BARYKIN, and TUNKEL', I., Ogonek, No 50, Dec 71, p 11

Petya did not complain and only looked at the world with puzzled, sad eyes. The entire arsenal of weapons available to today's therapy was put in motion. "Without effect" was the sharp verdict entered in the unimpassioned case history. Behind these two words there was the family's grief, the tragedy of the boy himself.

...Yuriy Mikhaylovich Lopukhin headed the group of surgeons. The operation was entrusted to Yuriy Ivanovich Morozov. Having taken the scalpel, Morozov was sure of himself. He had occasion to perform many operations, which were not merely complicated, but often very rare and experimental. He is referred to as the "golden scalpel." Yuriy Ivanovich more than once boldly engated in a personal combat against diseases and conquered them. His boldness came from experience. Morozov remembered the words he had once heard from A. A. Vishnevskiy: "A surgeon's boldness should not exceed his skill." Yuriy Ivanovich now thought out the entire operation in his mind, i.e., from the first superficial incision to the concluding suture.

...Morozov once again examined the thymus prepared for transplantation. To this day far from everything is known about the thymus. "This gland is a puzzle," one of the professors told us. It had already been proved, however, that the first days and months of man's life are the periods of its

2/7

- 42 -

USSR

BARYKIN, and TUNKEL', I., Ogonek, No 50, Dec 71, p 11

greatest activity. The thymus is a unique starter, which includes many life-support systems. It adjusts them and gives them a definite tone.

As a rule, a man with a normal thymus is prepared for a fight against many diseases, i.e., he has a reliable immunity. But diseases do not leave the man whose thymus is underdeveloped in peace.

... In the history of this disease, which goes back many centuries, the year 1941 was marked by an important circumstance. The French physician Louis-Bar described this disease for the first time. Prior to that date the Louis-Bar syndrome had not been recorded by physicians, remained unidentified, and had not been diagnosed. ("Encephalitis," some said. "Something unexplainable," others shrugged their shoulders.) Alas, they knew very well that there was a disease that caused a child to be bedridden at about the age of 5, a disease in which progressive ataxia, i.e., failure of motor coordination, began. Ataxia was the second symptom in the description of this disease. Louis-Bar was the first to note the inevitably frequent, incessant infectious diseases.

In the Louis-Bar syndrome the tiny patient loses has strength slowly with an ominous consistency, and not only physical strength. Physicians note that even the child's mental development remains retarded. He sharply lags behind children his own age. The gap between age and maturation increases every year.

3/7

USSR

BARYKIN, and TUNKEL', I., Ogonek, No 50, Dec 71, p 11

Another landmark, i.e., the year 1971, has now appeared in the history of this disease. This date is connected with the work of Soviet physicians, primarily with the names of the academician of the Academy of Medical Sciences USSR Yuriy Mikhaylovich Lopukhin and Candidate of Medical Sciences Yuriy Ivanovich Morozov.

Yu. I. Morozov was the first in the world to perform such an operation, He implanted a healthy thymus with the bone marrow contained in the breast bone in a child born with an underdeveloped thymus. Later on, when this and subsequent operations were evaluated, the following was noted: "The immediate and remote results proved to be good..." Particular emphasis was placed on the great scientific value of the work on thymus transplantation, which is now being successfully conducted at the Department of Clinical and Experimental Surgery at the Second Moscow Medical Institute of the Ministry of Health RSFSR.

"The problem has now expanded and many researchers have begun to work on its solution. Obviously, only collective efforts can bring success," Yu. M. Lopukhin says. Talented professors, i.e., the immunologist R. V. Petrov and the biophysicist S. S. Vasileyskiy, are conducting research that has yielded important results. Our young colleagues are also helping a great deal. This enables us to organize our work broadly and systematically... The thymus is now being thoroughly investigated in the clinic. Lectures

4/7

- 43 -

USSR

BARYKIN, and TUNKEL", I., Ogonek, No 50, Dec 71, p 11

in immunology are given for the first time to students in senior courses.
"Exemption from taxes," this is the literal translation of the word "immunity."
But in what does this "exemption" lie? After all, the thymus -- the switch
of the immune systems -- is active only during the first years of life. Some
believe that cells together with the blood stream enter the thymus, take a
"course in immunological sciences" here, and, after completing their education,
return to their places to resist a possible attack of microbes and to free man
from the heavy taxes that microbes impose on him. Other think that the thymus
sends its "teachers" all over the organism and they develop the immunological
capabilities of the cells on the spot. Still others say that the thymus
is simply a gland that produces a hormone and, after developing and sending its
"agents," it dies away.
        Whatever the explanation, the role of the thymus is an important one.
The knowledge and experience of Lopukhin, Petrov, Morozov, Vasileyskiy, and of
their colleagues and assistants are directed toward revealing all the secrets
and capabilities of the thymus and toward finding the method of controlling
the host of diseases described by Louis-Bar.
        "A great deal depends on age. If the disease can be discovered at its
early stage, when the child is 1 or 2-years old, one can speak with a great
degree of assurance of the probability of an almost complete recovery,"
5/7